



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590

02/20/2003

Ronald O Neerings Esq
Texas Instruments Incorporated
P O Box 655474 MS 3999
Dallas, TX 75265

EXAMINER

D AGOSTA, STEPHEN M

ART UNIT

CLASS-SUBCLASS

2684

455-101000

DATE MAILED: 02/20/2003

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/578,004 | 05/24/2000 | Anand G. Dabak | TI-29286 | 4545 |

TITLE OF INVENTION: WIRELESS SYSTEM WITH TRANSMITTER HAVING MULTIPLE TRANSMIT ANTENNAS AND COMBINING OPEN LOOP AND CLOSED LOOP TRANSMIT DIVERSITIES

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE | PUBLICATION FEE | TOTAL FEE(S) DUE | DATE DUE |
|----------------|--------------|-----------|-----------------|------------------|------------|
| nonprovisional | NO | \$1300 | \$0 | \$1300 | 05/20/2003 |

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
- B. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
- B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.
- ☐ Applicant claims SMALL ENTITY status.
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Box ISSUE FEE
Commissioner for Patents
Washington, D.C. 20231
Fax (703)746-4000

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)
7590 02/20/2003

Ronald O Neerings Esq
Texas Instruments Incorporated
P O Box 655474 MS 3999
Dallas, TX 75265

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above, or being facsimile transmitted to the USPTO, on the date indicated below.

| |
|--------------------|
| (Depositor's name) |
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/578,004 | 05/24/2000 | Anand G. Dabak | TI-29286 | 4545 |

TITLE OF INVENTION: WIRELESS SYSTEM WITH TRANSMITTER HAVING MULTIPLE TRANSMIT ANTENNAS AND COMBINING OPEN LOOP AND CLOSED LOOP TRANSMIT DIVERSITIES

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE | PUBLICATION FEE | TOTAL FEE(S) DUE | DATE DUE |
|----------------|--------------|-----------|-----------------|------------------|------------|
| nonprovisional | NO | \$1300 | \$0 | \$1300 | 05/20/2003 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---------------------|----------|----------------|
| D AGOSTA, STEPHEN M | 2684 | 455-101000 |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) ☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

☐ Issue Fee

☐ Publication Fee

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

☐ A check in the amount of the fee(s) is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Commissioner is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

Commissioner for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE(S)



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/578,004 | 05/24/2000 | Anand G. Dabak | TI-29286 | 4545 |

7590 02/20/2003

Ronald O Neerings Esq
Texas Instruments Incorporated
P O Box 655474 MS 3999
Dallas, TX 75265
UNITED STATES

EXAMINER

D AGOSTA, STEPHEN M

ART UNIT

PAPER NUMBER

2684

DATE MAILED: 02/20/2003

Determination of Patent Term Extension under 35 U.S.C. 154 (b)
(application filed after June 7, 1995 but prior to May 29, 2000)

The patent term extension is 0 days. Any patent to issue from the above identified application will include an indication of the 0 day extension on the front page.

If a continued prosecution application (CPA) was filed in the above-identified application, the filing date that determines patent term extension is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system. (<http://pair.uspto.gov>)

Any questions regarding the patent term extension or adjustment determination should be directed to the Office of Patent Legal Administration at (703)305-1383.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

| | | | | |
|--|-------------|----------------------|---------------------|------------------|
| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 09/578,004 | 05/24/2000 | Anand G. Dabak | TI-29286 | 4545 |
| 7590 | 02/20/2003 | | EXAMINER | |
| Ronald O Neerings Esq Texas Instruments Incorporated P O Box 655474 MS 3999 Dallas, TX 75265 UNITED STATES | | | D AGOSTA, STEPHEN M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2684 | |
| DATE MAILED: 02/20/2003 | | | | |

Notice of Fee Increase on January 1, 2003

If a reply to a "Notice of Allowance and Fee(s) Due" is filed in the Office on or after January 1, 2003, then the amount due will be higher than that set forth in the "Notice of Allowance and Fee(s) Due" since there will be an increase in fees effective on January 1, 2003. See Revision of Patent and Trademark Fees for Fiscal Year 2003; Final Rule, 67 Fed. Reg. 70847, 70849 (November 27, 2002).

The current fee schedule is accessible from: <http://www.uspto.gov/main/howtofees.htm>.

If the issue fee paid is the amount shown on the "Notice of Allowance and Fee(s) Due," but not the correct amount in view of the fee increase, a "Notice to Pay Balance of Issue Fee" will be mailed to applicant. In order to avoid processing delays associated with mailing of a "Notice to Pay Balance of Issue Fee," if the response to the Notice of Allowance and Fee(s) due form is to be filed on or after January 1, 2003 (or mailed with a certificate of mailing on or after January 1, 2003), the issue fee paid should be the fee that is required at the time the fee is paid. If the issue fee was previously paid, and the response to the "Notice of Allowance and Fee(s) Due" includes a request to apply a previously-paid issue fee to the issue fee now due, then the difference between the issue fee amount at the time the response is filed and the previously paid issue fee should be paid. See Manual of Patent Examining Procedure, Section 1308.01 (Eighth Edition, August 2001).

Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Notice of Allowability

Application No.

09/578,004

Examiner

Stephen M. D'Agosta

Applicant(s)

DABAK ET AL.

Art Unit

2684

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 1-30-03.
2. ☒ The allowed claim(s) is/are 1,4-7,11,13-34 and 36.
3. ☒ The drawings filed on 30 January 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - (a) ☐ The translation of the foreign language provisional application has been received.
6. ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☒ CORRECTED DRAWINGS must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No. _____.
 - (b) ☒ including changes required by the proposed drawing correction filed 1-30-03, which has been approved by the Examiner.
 - (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1 <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 2 <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3 <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 4 <input type="checkbox"/> Interview Summary (PTO-413), Paper No. _____. |
| 5 <input type="checkbox"/> Information Disclosure Statements (PTO-1449), Paper No. _____. | 6 <input type="checkbox"/> Examiner's Amendment/Comment |
| 7 <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | 8 <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9 <input type="checkbox"/> Other |

DETAILED ACTION

Response to Amendment

The amendment filed on 1-30-03 under 37 CFR 1.131 is sufficient to overcome the Harrison reference:

1. The corrected drawing (attached to end of amendment) is accepted by the examiner (per Notice of Allowance, applicant must re-submit this as a formal [corrected] drawing).

2. Claims 1, 4-7, 11, 13-34 and 36 allowed as follows:

Claim 1 is now amended such that the combined references do not teach the recitation of amended claim 1, and further there is no motivation in the cited art to combine the various references to provide the elements of claim 1.

Harrison teaches the application of both open loop diversity and closed loop diversity, (column 1, lines 58-67) but the specific text cited describes using a system that alternates, or switches between, the open loop diversity of orthogonal transmit diversity ("OTD") and the closed loop diversity of adaptive antenna transmission. Thus, Harrison column 1 suggests an encoder that receives symbols and applies open loop diversity to some of those symbols and closed loop diversity to other of those symbols. In contrast, claim 1 recites that its "encoder circuitry" is "for receiving a plurality of symbols" and that "encoder circuitry is for applying space time block coded transmit antenna diversity and closed loop diversity to the plurality of symbols to form the signals." Since the claim speaks in terms of "the plurality of symbols," it is respectfully submitted that it is that same plurality of symbols that receives both the open loop and closed loop diversity, rather than sub-dividing that plurality into alternative groups as is suggested by Harrison column 1.

Harrison describes one approach that results in a "mixed mode" that is, one that is not strictly an orthogonal transmit diversity mode nor an adaptive array mode. In this mixed mode base transmitter 52 exhibits characteristics of both modes. " Further, even given that such an approach includes some variant that "is not strictly" either open loop (i.e., OTD) or closed loop (i.e., adaptive array), then Applicants respectfully traverse the notion that space time block coded transmit antenna diversity, as recited in claim 1, is an obvious extension of the Harrison "mixed mode." In other words, it is not a case, as possibly suggested by the Examiner, where each of the various types of diversity raised by the Examiner may be merely substituted for one another into Harrison. Indeed, if such an attempt is made as detailed below, then the result does not satisfy the limitations of claim 1.

Looking in greater detail to the "mixed mode" of Harrison, further examination of Harrison Figure 5 is instructive. In that Figure 5, spread traffic signals 72 and 74 are inputs, and they go through various processes with the result producing element signals 94 and 96; these processes are such that the inputs are "combined by adding a portion in one path to the signal in the other path.". This combination includes the multiplication and summing as shown in Figure 5. Given that configuration, if "the value of α is equal to 0, and adaptive array weights V_o and V_i at multipliers 180 and 182 are equal to 1, adaptive array processor 166 is figured so that base transmitter 52 operates in an orthogonal transmit diversity mode," that is, in a purely open loop mode. Thus, in this instance, Harrison Figure 5 evidently receives OTD symbol inputs at 72 and 74 and effectively provides those same OTD symbols at its outputs 94 and 96. In contrast, a purely closed loop adaptive array is provided if α is $1/2^{1/2}$ and V_o and V_i are non-zero values. Harrison goes on to then state that to get its "mixed mode" that is "not strictly" either OTD nor adaptive array, then its α must be between 0 and $1/2^{1/2}$.

However, if the suggestion of merely substituting STTD into Harrison is applied, then such an approach would provide STTD symbols to Harrison inputs 72 and 74, in which case the STTD nature is destroyed in the resulting signals, that is, there is Harrison, col 7, lines 50-51. Harrison, col 8, lines 4-8. Harrison, col 8, lines 13-21 longer an STTD encoding in the transmitted signals. To further appreciate this, assume that the symbols over two successive time periods to inputs 72 and 74 take the STTD format in the following Table 1:

| Input | Time 0 | Time 1 |
|-------|--------|--------|
| 72 | A | B |
| 74 | -B | A |

Table 1

For simplification in applying this assumption in Harrison, let $AUX_a = AUX_i = 0$ and let $V_o = V_i = 1$, then presumably the outputs for these symbols will be as shown in the following Table 2:

| Output | Time 0 | Time 1 |
|--------|--|---|
| 94 | $A \times (1-\alpha^2)^{1/2} + B\alpha$ | $B \times (1-\alpha^2)^{1/2} + A\alpha$ |
| 96 | $-B \times (1-\alpha^2)^{1/2} + A\alpha$ | $A \times (1-\alpha^2)^{1/2} + B\alpha$ |

Table 2

From Table 2, however, one skilled in the art will appreciate that if a value of $\alpha > 0$ is applied as is stated as a requirement by Harrison to achieve its use of both open and closed loop diversity, then the values in Table 2 are each adjusted in such a manner that there is no longer an STTD relationship between the four outputs across the two times. Stated simply, therefore, even if there were a suggestion in the art to merely substitute STTD into Harrison, then the result would not produce an accurate

Art Unit: 2684

result and nor would it provide the combined recitations of claim 1. Lastly, the additional noted references do not cure this deficiency.

In view of the preceding, amended claim 1 is in condition for allowance (claims 4 through 7, 11, and 13 through 27 depend from claim 1 and, thus, also are in condition for allowance).

Independent claims 28 and 34 are also amended consistent with the discussion of the above. Further, claim 34 is rejected under the same bases as independent claim 1, and claim 28 is rejected under 35 U.S.C. § 103(a) in view of Harrison. As demonstrated above, Harrison does not demonstrate various aspects now added by amendment into independent claims 28 and 34 and, thus, these claims as well as their respective dependent claims 29 through 33 as depending from claim 28, and 36 as depending from claim 34, are also in condition for allowance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. D'Agosta whose telephone number is 703-306-5426. The examiner can normally be reached on M-F, 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Hunter can be reached on 703-308-6732. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

SMD
February 7, 2003


THANH CONG LE
PRIMARY EXAMINER


2/08/03